WHAT IS CLAIMED IS:

1. A temperature sensor configured for slidable mounting within a heat sink bore of a heat sink of a burn-in of a heat exchange system, the temperature sensor comprising:

a support member slidably mountable within the heat sink bore and having first and second ends, a socket formed in the first end, a bore extending from the socket through the second end, and a flange positioned between the first and second ends;

a resistance temperature detector (RTD) seated in the socket and having a chip contact surface that is raised relative to the first end, the RTD configured to produce a temperature signal that is indicative of a temperature at the chip contact surface; and

signal leads attached to the RTD and extending through the bore of the support member and out the second end of the support member.

2. The temperature sensor of claim 1, wherein the socket is rectangular.

3. The temperature sensor of claim 1, wherein the signal leads extend from a bottom of the RTD, which opposes the chip contact surface.

4. A heat exchange system for controlling a temperature of an integrated circuit chip mounted in a burn-in oven, the system comprising:

a heat sink having a chip engaging surface that is positionable to engage a surface of a chip, a heat sink bore extending through the chip engaging surface, and a shoulder formed within the heat sink bore;

a temperature sensor including:

a support member slidably mounted in the heat sink bore and having first and second ends, a socket formed in the first end, a bore extending from the socket through the second end, and a flange positioned between the first and second ends, wherein movement of the support member within the heat sink bore is limited by engagement of the shoulder by the flange;

a resistance temperature detector (RTD) seated in the socket and having a chip contact surface that is raised relative to the first end, the RTD configured to produce a temperature signal that is indicative of a temperature at the chip contact surface; and

signal leads attached to the RTD and extending through the bore of the support member and out the second end of the support member; and

a resilient member configured to urge the first end of the temperature sensor through the chip-engaging surface of the heat sink.

5. The system of claim 4, wherein the socket is rectangular.

6. The system of claim 4, wherein the signal leads extend from a bottom of the RTD, which opposes the chip contact surface.

7. The system of claim 4, wherein the resilient member is a spring that engages the flange on a side that is opposite the RTD.

8. The system of claim 4 including:

a liquid source;

an inlet port fluidically coupled to the liquid source and in fluid communication with a heat exchange gap between the surface of the chip and the chip engaging surface of the heat sink; and

a liquid flow travelling from the liquid source through the inlet port, and into the heat exchange gap to thereby form a liquid layer.

9. The system of claim 8, wherein the heat exchange gap is defined by non-contacting portions of the chip engaging surface of the heat sink and the surface of the chip.

10. The system of claim 8, wherein the heat sink includes a plurality of passageways in fluid communication with a source of heat exchanging fluid.

11. The system of claim 8, including a cup member for supporting the heat sink, the cup member having a wall portion encircling the heat sink and providing an opening through which a boss of the heat sink extends.

12. The system of claim 11, including at least one resilient member for urging the chip engaging surface of the heat sink against the surface of the chip.

13. The system of claim 8, wherein the liquid flow has a flow rate that is controlled in response to the temperature signal.

14. The system of claim 8, including:

a heat sink temperature sensor having a heat sink temperature output signal that is indicative of a temperature of the heat sink; and

a liquid controller for controlling the liquid flow in response to the heat sink temperate

output signal from the heat sink temperature sensor and the temperature signal from the RTD.

15. The system of claim 14, wherein the liquid controller controls the liquid flow in response to a thermal resistance between the chip engaging surface of the heat sink and the surface of the chip using the heat sink temperature output signal and the temperature signal from the RTD.

16. The system of claim 8, wherein the liquid source contains distilled water.

17. The system of claim 8, wherein the heat sink includes a moat surrounding the chip-engaging surface.

18. A heat exchange system for controlling a temperature of an integrated circuit chip during burn-in temperature stressing of the chip, the system comprising:

a chip mount for supporting a chip;

a liquid source;

a heat sink having a chip engaging surface facing the chip mount, and having a plurality of inlet ports each fluidically couple to the liquid source, a heat sink bore extending through the chip engaging surface, and a

shoulder formed within the heat sink bore; and

a temperature sensor including:

a support member slidably mounted in the heat sink bore and having first and second ends, a socket formed in the first end, a bore extending from the socket through the second end, and a flange positioned between the first and second ends, wherein movement of the support member within the heat sink bore is limited by engagement of the shoulder by the flange;

a resistance temperature detector (RTD) seated in the socket and having a chip contact surface that is raised relative to the first end, the RTD configured to produce a temperature signal that is indicative of a temperature at the chip contact surface; and

signal leads attached to the RTD and extending through the bore of the support member and out the second end of the support member;

a resilient member configured to urge the first end of the temperature sensor through the chip engaging surface of the heat sink; and

a liquid flow controller for controlling a liquid flow travelling from the liquid source through the inlet ports.

19. The system of claim 18, wherein the socket is rectangular.

20. The system of claim 18, wherein the signal leads extend from a bottom of the RTD, which opposes the chip contact surface.

21. The system of claim 18, wherein the liquid flow is controlled by the liquid flow controller based upon the temperature signal from the RTD.

22. The system of claim 18 including a heat sink temperature sensor having a heat sink temperature output signal that is indicative of a temperature of the heat sink.

23. The system of claim 22, wherein the liquid flow controller controls the liquid flow in response to the heat sink temperature output signal from the heat sink temperature sensor and the temperature signal from the RTD.

24. The system of claim 22, wherein the liquid flow controller controls the liquid flow in response to a thermal resistance between the chip engaging surface

and a surface of a chip being temperature stressed, wherein the thermal resistance is calculated using the heat sink temperature output signal and the temperature signal from the RTD.

25. The system of claim 18 including a cup member for supporting the heat sink, the cup member having a wall portion encircling the heat sink and providing an opening through which a boss of the heat sink extends.

26. The system of claim 18, including at least one resilient member for urging the chip-engaging surface of the heat sink toward the chip mount.

27. The system of claim 18, wherein the liquid source comprises distilled water.

28. The system of claim 18, wherein the heat sink includes a moat surrounding the chip-engaging surface.